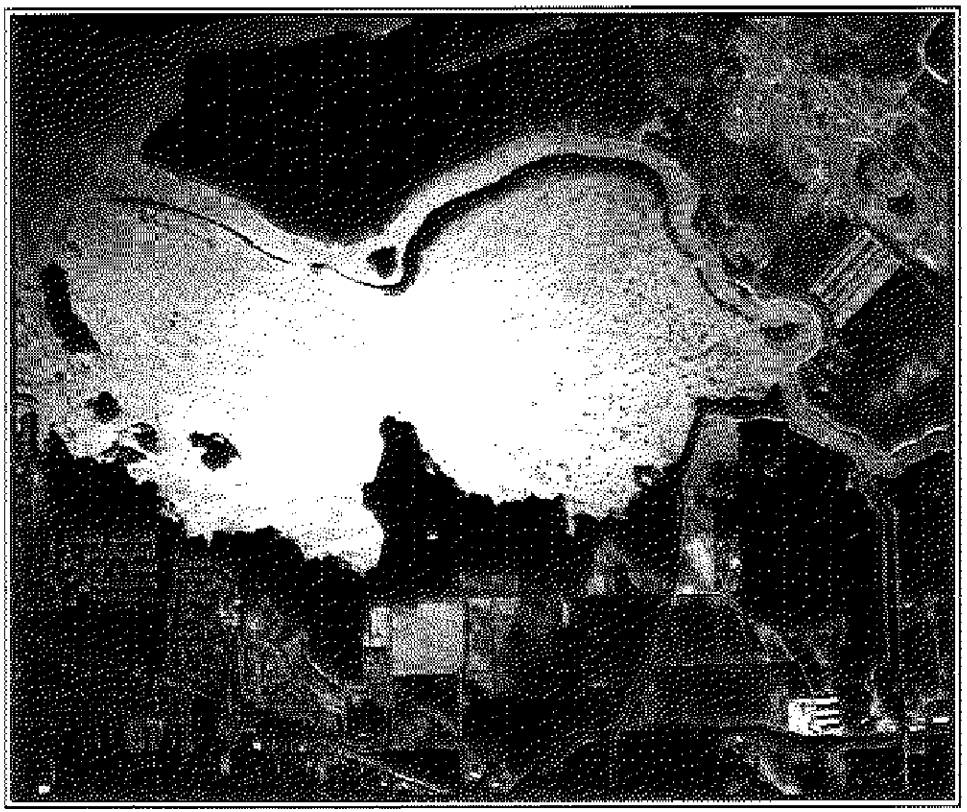
THE

DELTA SCIENCE CENTER

AT BIG BREAK



MARSH CREEK WATERSHED SCIENCE PROGRAM

APRIL 1999 • ECOSYSTEM RESTORATION PROJECTS AND PROGRAMS • CALFED BAY-DELTA PROGRAM

LOCAL WATERSHED STEWARDSHIP

PSP Cover Sheet

Proposal Title: Marsh Creek Watershed Science Program
Applicant Name: The Delta Science Center at Big Break
Mailing Address: 86 Orchard Estates Drive, Walnut Creek, CA 94598
Telephone: 925-947-1473
Fax: 925-947-1473
Email: DSCatBB@aol.com

Amount of funding requested: $ 163,474 for 1 years

Indicate the Topic for which you are applying (check only one box).

- ☐ Fish Passage/Fish Screens
- ☐ Habitat Restoration
- ☒ Local Watershed Stewardship
- ☐ Water Quality
- ☐ Introduced Species
- ☐ Fish Management/Hatchery
- ☐ Environmental Education

Does the proposal address a specified Focused Action? x yes _____ no

What county or counties is the project located in? Contra Costa

Indicate the geographic area of your proposal (check only one box):

- ☐ Sacramento River Mainstem
- ☐ Sacramento Trib: _____
- ☐ San Joaquin River Mainstem
- ☐ San Joaquin Trib: _____
- ☒ Delta: Big Break on the San Joaquin
- ☐ East Side Trib: _____
- ☐ Suisun Marsh and Bay
- ☐ North Bay/South Bay: _____
- ☐ Landscape (entire Bay-Delta watershed)
- ☐ Other: _____

Indicate the primary species which the proposal addresses (check all that apply):

- ☒ San Joaquin and East-side Delta tributaries fall-run chinook salmon
- ☒ Winter-run chinook salmon
- ☐ Late-fall run chinook salmon
- ☒ Delta smelt
- ☒ Splittail
- ☒ Green sturgeon
- ☒ Migratory birds
- ☒ Other: black rail
- ☒ Spring-run chinook salmon
- ☒ Fall-run chinook salmon
- ☒ Longfin smelt
- ☒ Steelhead trout
- ☒ Striped bass
- ☒ All chinook species
- ☒ All anadromous salmonids

Specify the ERP strategic objective and target (s) that the project addresses. Include page numbers from January 1999 version of ERP Volume I and II:
Tidal Perennial Aquatic Habitat, pg. 114; Natural Flood Plains and Flood Processes, pg. 83; Delta Sloughs, pg. 120; Splittail, pg. 207; All Runs of Chinook Salmon, pg. 220-222.

I-017621

Indicate the type of applicant (check only one box):

☐	State agency	☐	Federal agency
☐	Public/Non-profit joint venture	☒	Non-profit
☐	Local government/district	☐	Private party
☐	University	☐	Other: _____

Indicate the type of project (check only one box):

☒	Planning	☐	Implementation
☐	Monitoring	☐	Education
☐	Research		

By signing below, the applicant declares the following:

1.) The truthfulness of all representations in their proposal;

2.) The individual signing the form is entitled to submit the application on behalf of the applicant (if the applicant is an entity or organization); and

3.) The person submitting the application has read and understood the conflict of interest and confidentiality discussion in the PSP (Section 2.4) and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant, to the extent as provided in the Section.

Stephen Barbata

Printed name of applicant

Stephen Barbata

Signature of applicant

TITLE PAGE

A. MARSH CREEK WATERSHED SCIENCE PROGRAM

B. THE DELTA SCIENCE CENTER at Big Break
Stephen Barbata, Executive Director
86 Orchard Estates Drive
Walnut Creek, CA 94598
Phone and fax: 925-947-1473

C. Participants are:

PROJECT OVERSIGHT
Stephen Barbata
Executive Director
The Delta Science Center
86 Orchard Estates Drive
Walnut Creek, CA 94598

TECHNICAL PARTNERS
Joshua Collins, Ph.D.
San Francisco Estuary Institute
1325 S. 46th Street
Richmond, CA 94804

Mike Moran
East Bay Regional Park District
Black Diamond Mine Regional Park
2950 Peralta Oaks Court
Oakland, CA 94620

Gregory A. Thomas: Technical Management and Planning
Natural Heritage Institute
114 Sansome Street, Suite 1200
San Francisco, CA 94702

Local students and community members

D. Nonprofit public benefit corporation
The East Bay Regional Park District is the fiscal agent for the DSC.

E. Tax identification number: 23-7011877

I-017623

EXECUTIVE SUMMARY

A. Project Title: Marsh Creek Watershed Science Program
Applicant Name: Delta Science Center at Big Break

B. Project Description

Marsh Creek is a rapidly urbanizing watershed that drains approximately 100 miles on the back side of Mt. Diablo into the Western Delta at Big Break. Size: The goal of the Marsh Creek Watershed Science Project is to engage local students and residents in a high quality data collection and analysis effort to guide restoration planning in the watershed from the headwaters to the Delta.

This project will be to organize a community-based watershed analysis to simultaneously improve scientific understanding of Marsh Creek and to build a knowledgeable local constituency for its restoration—requisite first steps toward the implementation of an environmentally sensible restoration program. This study is based on a model developed by Luna Leopold and Josh Collins of the San Francisco Estuary Institute. It is predicated on the idea that you must "listen to the river" before implementing restoration measures and that even well-intended restoration efforts are easily misguided when they are not based on a scientifically sound understanding of the system. In watersheds throughout California, citizens are bursting with energy to implement restoration actions but are lacking the data and knowledge to make informed decisions. This proposal lays out a plan of action to engage local students and enthusiastic citizens in the collection and analysis of data from Marsh Creek. The Delta Science Center will serve as a "riparian station," providing a forum for an interdisciplinary team of scientists and educators from the SFEI, NHI, and the East Bay Regional Park District to work with local citizens to develop consistent data collection protocol and analysis.

C. Approach/Tasks/Schedule	**Completion Date**
• Phase I: Public Outreach and Basic Data Collection	November 1999
• Phase II: Citizen Training, Detailed Investigation, Restoration Design	July 2000
• Phase III: Ongoing Investigations, Implementation, Monitoring	Long Term

D. Justification for Project and Funding by CALFED

Marsh Creek is important because: 1) it drains directly into Big Break and the Western Delta—critical habitat for multiple native Delta fishes; 2) rapid urbanization in the watershed threatens to degrade aquatic resources in the creek and western Delta; 3) Marsh Creek continues to support populations of endangered and declining native species such as western pond turtle and red legged frogs; 4) a restored Marsh Creek could potentially provide spawning and rearing habitat for native fish including Sacramento splittail and chinook salmon.

Unlike nearly every other major creek in Contra Costa County, Marsh Creek still has a chance for restoration. With proper information and planning, Marsh Creek could be restored into a thriving riparian ecosystem that supports native aquatic species along its entire length, including runs of Chinook salmon, western pond turtles, red-legged frogs, and splittail. However, this restoration opportunity will soon be precluded by the rapid pace of urbanization. Without the foresight and energy this effort will bring to Marsh Creek, it will be rapidly and permanently transformed into a lifeless channel for routing polluted urban run-off to the Western Delta. Stemming the tide of

toxics, metals, and exotics that are almost certain to follow urbanization of the watershed without prophylactic actions will be costly if not futile. This proposal seeks funds to develop a Watershed Science Program to organize the local community and collect the information necessary to guide restoration planning implement watershed restoration.

E. Budget Costs and Third Party Impacts	**Cost**
• Phase I: Public Outreach and Basic Data Collection	$70,355
• Phase II: Citizen Training, Detailed Investigation, restoration design	$196,400
Total before Cost Share	**$266,755**
Total Requested after Cost Share	**$163,474**
• Phase III: Ongoing Investigation and Monitoring	uncertain

No third party impacts are anticipated.

F. Applicant Qualifications

Steve Barbata is Executive Director of the Delta Science Center (DSC). He previously served as director of the regionally acclaimed Lindsey Wildlife Museum and has 25 years of experience in the design, building and funding of educational institutions. Greg Thomas, David Fullerton, and John Cain of the Natural Heritage Institute (NHI) will all participate in project implementation. John Cain M.L.A, who will oversee day-to-day management of the project, has a graduate degree in environmental planning and eight years of experience in aquatic habitat restoration planning and research. NHI Board member Luna Leopold, Ph.D. is the primary author of the watershed study program and world renowned for his expertise in hydrology and fluvial systems. He and Josh Collins, Ph.D., and Laurel Collins, of the San Francisco Estuary Institute, will actively participate and advise the project. These three have successfully implemented the Watershed Science Program in other Bay Area Watersheds. Mike Moran M.S., an interpreter for EBRPD, is stationed in the watershed and has a decade of experience interpreting and studying ecological processes. Professor Christine Hagelin of Los Medanos College and Dr. Darrell Slotton will serve as special consultants to DSC.

G. Monitoring and Data Evaluation

Project will train local citizens in data collection and analysis techniques necessary to make informed management decisions for Marsh Creek. Josh Collins, a member of the CMARP panel, will review the data collection protocol and project scientist will review data quality and assume primary responsibility for analysis. Baseline monitoring and analysis will focus on describing hydrology, channel morphology, fluvial sediment transport functions, extent of riparian vegetation, historical changes in geomorphology and riparian vegetation. Dr. Darell Slotton of the U.C. Davis Mercury group will be retained to collect bioassay fish and macro invertebrate samples from stations he established and monitored between 1995-97.

H. Local Support, Coordination with other Programs, and Compatibility

This project is organized and managed by the Delta Science Center, a non-profit 501C-3 organization. Numerous local groups, interests, and institutions are represented on the Board of the Delta Science Center including Emerson Dairy, Contra Costa County, the East Bay Regional Park District, Contra Costa Water District, Contra Costa Community College District, Cal State Hayward, PG&E, the Sierra Club and the Audubon Society. See attached letters of support.

PROJECT DESCRIPTION

Proposed Scope of Work

Unlike nearly every other major creek in Contra Costa County, Marsh Creek still has a chance for restoration. With proper information and planning, Marsh Creek could be restored into a thriving riparian ecosystem that supports native aquatic species along its entire length, including runs of Chinook salmon, western pond turtles, red-legged frogs, and splittail. However, this restoration opportunity will soon be precluded by the rapid pace of urbanization. Without the foresight and energy this effort will bring to Marsh Creek, it will be rapidly and permanently transformed into a lifeless channel for routing polluted urban run-off to the Western Delta. This proposal seeks funds to develop a Watershed Science Program to organize the local community and collect the information necessary to guide restoration planning implement watershed restoration.

The goals of the Marsh Creek watershed project are to:

- Engage local students and residents in a high quality data collection and analysis effort that will inform restoration planning in the watershed from the headwaters to the Delta.
- Assist local citizens in the development of short and long-term restoration strategies.

The focus of the project will be to organize a community-based watershed analysis to simultaneously improve scientific understanding of the ecological trends and processes shaping Marsh Creek and to build a knowledgeable local constituency for restoration—requisite first steps toward the implementation of an environmentally sensible restoration program. This approach is based on a model developed by Luna Leopold and Josh Collins of the San Francisco Estuary Institute. It is predicated on the idea that you must "listen to the river" before implementing restoration measures and that even well-intended restoration efforts are easily misguided when they are not based on a scientifically sound understanding of the system. This proposal lays out a plan of action to engage local students and citizens in the collection and analysis of data from Marsh Creek. An interdisciplinary team of scientists and educators from SFEI, Delta Science Center, NHI, and EBRPD will work with these local citizens to develop consistent data collection protocol and provide the expertise to properly analyze the data. Ultimately, the Delta Science Center will assume the role of a "Riparian Station," serving as a clearinghouse for data collected on the restoration of the Marsh Creek watershed from its headwaters on Mt. Diablo to its confluence with the Delta at the Big Break marsh.

This project consists of three phases. This proposal seeks funding for phases I and II. These phases could be funded separately.

Phase I: Public Outreach, Existing Conditions Analysis, and field reconnaissance.
Phase II: Citizen Training, detailed field data collection, and restoration design.
Phase III: Implementation and ongoing monitoring.

Phase I: Public Outreach, Existing Conditions Analysis, and Field Reconnaissance

Task 1: Public Outreach and Agency Coordination: Representatives from the Delta Science Center (DSC) and the East Bay Regional Park District (EBRPD) will conduct an intensive public outreach program. The Science Center will focus on meeting with private landowners and local governments while EBRPD will emphasize public outreach to thousands of new residents on

interpretive tours in the watershed. DSC will meet solicit the views of diverse stakeholder interests, including agricultural property owners bordering Marsh Creek, residential property owners, and the mayors and city council members of the cities of Brentwood, Oakley, and Antioch. The information garnered will be consolidated into a report and presentation back to the community.

Schedule: First three quarters.
Deliverable: A report documenting survey results of public concerns and preferences and six community meetings.

Task 2: Compile, Analyze, and Present Existing Data and Reports: Scientists and planners from the Natural Heritage Institute (NHI) will collect and assemble all existing reports, information, and digital data sets on the project area including: census tract data, DWR land use types, county parcel boundaries, public lands, and hydrology. A hydrologist will analyze hydrologic data on Marsh Creek to discern patterns in flood frequency and flow duration. SFEI and NHI will develop a rectified, digital, photographic base map for accurate mapping and compelling presentation. NHI will compile existing digital geographic data sets from disparate sources. Major historical human, economic, and natural events that have shaped the watershed will be identified and mapped to illustrate the interaction between watershed processes, urbanization, flood control, biodiversity, agricultural preservation, demographics, economic well being and other factors.

Schedule: First three quarters.
Deliverables: An environmental atlas of marsh Creek. Suitable data will be incorporated in the SFEI Eco Atlas. Digital data sets will be posted on the DSC web site.

Task 3: Field Reconnaissance and Preliminary Survey: To generally characterize representative conditions in the watershed and to guide future analysis and restoration planning, NHI and SFEI will conduct a field reconnaissance and preliminary survey. They will classify stream reaches, survey and sketch representative cross sections, conduct pebble counts to characterize bed material patterns, map locations of engineered structures and the extent of perennial flows and significant features such as large pools.

Schedule: Second quarter
Deliverable: Field notes and maps will be reproduced as well as incorporated into the Marsh Creek Atlas (hard copy) and the Eco Atlas

Phase II: Citizen Training, Detailed Field Data Collection and Analysis, and Restoration Design

Task 4: Coordinate a Community Based Watershed Monitoring Program: In this task DSC and EBRPD will coordinate a public data collection effort under the guidance of SFEI and NHI. A "core group" of teachers, students, and volunteers will be trained to collect and organize data from the field. SFEI will establish data collection and reporting protocol compatible with CMARP standards.

Schedule: Third quarter.
Deliverable: 4 day-long, weekend training sessions; user-friendly data collection in reporting protocol guide.

Task 5: Detailed Field Collection and Analysis: With the assistance of volunteers, project scientists will conduct a detailed data collection and analysis effort to establish an environmental baseline to characterize historical and present hydrologic, geomorphic, and ecological. NHI scientists will lead analysis of aerial photos, maps and other data in order to describe extent of: past floods, wildfires, vegetation, and major land-use changes. SFEI and NHI will coordinate field mapping and data collection to describe channel and riparian habitat types; analyze vegetation; survey channel form; and to develop detailed geomorphic maps of representative reaches.

Schedule: Fourth through eighth quarters.

Deliverable: Field data will be organized for input into the SFEI Eco Atlas and prepared for inclusion in reports described in task 7.

Task 6: Coordinate a Community Based, Short-Term Restoration Strategy: A long-term restoration strategy will focus on collecting the data necessary to develop an integrated and environmentally sensible watershed restoration plan. In this task we will work with local citizens and planners to identify problems and stream reaches for further analysis. During this phase, we will jointly analyze these problems with local citizens and agencies and develop a strategy to resolve them. Problems that we will address include:

- Rededicate abandoned mine tailings in the upper watershed[1]
- Restore connectivity between the upper and lower watershed at the Marsh Creek reservoir
- Develop a conservation easement program to protect the riparian corridor from urban encroachment Restore a continuous corridor of riparian vegetation along the lower reaches.
- Collaborate with the Brentwood Sanitation district to develop an environmentally beneficial tertiary water discharge project along Marsh Creek

Schedule: Seventh quarter

Deliverable: A plan describing the specific restoration actions and a strategy for funding implementation.

Task 7: Public Presentation and Reporting: The **deliverable** of this reporting task will include preparation and distribution of a graphically rich public report presenting and integrating findings of all previous tasks. A similar technical report will also be developed with more detail. Both reports will be available on the DSC web-site. Community meetings will be held to present findings and solicit recommendations for future steps.

Schedule: Eighth quarter

Task 8: Project Management: The DSC will manage community relations and organizing, with NHI coordinating restoration planning and data collection and analyses.

Location and geographic boundaries

The location of this study will be limited to the boundaries of the Marsh Creek Watershed. Students from other portions of East Contra Costa County will be invited to participate in the study (Figure 1).

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[1] Previous studies (Slotton, et al. 1998) indicate that erosion of mine tailing is contaminating the creek with mercury. We will work with Darrel Slotton and local citizens and agencies to develop a remediate strategy.

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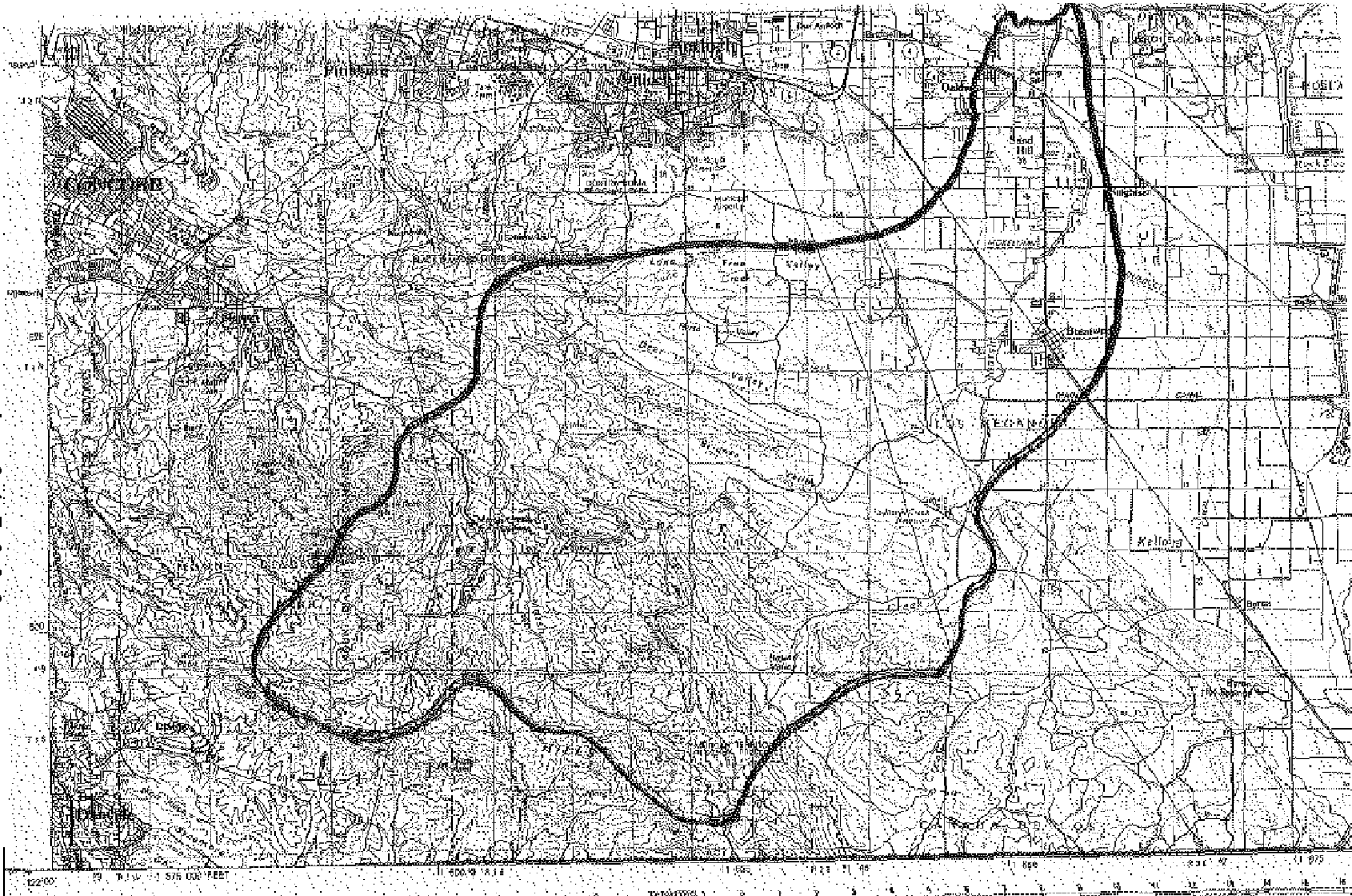

Figure 1: Marsh Creek Watershed

Scale: 1:100,000

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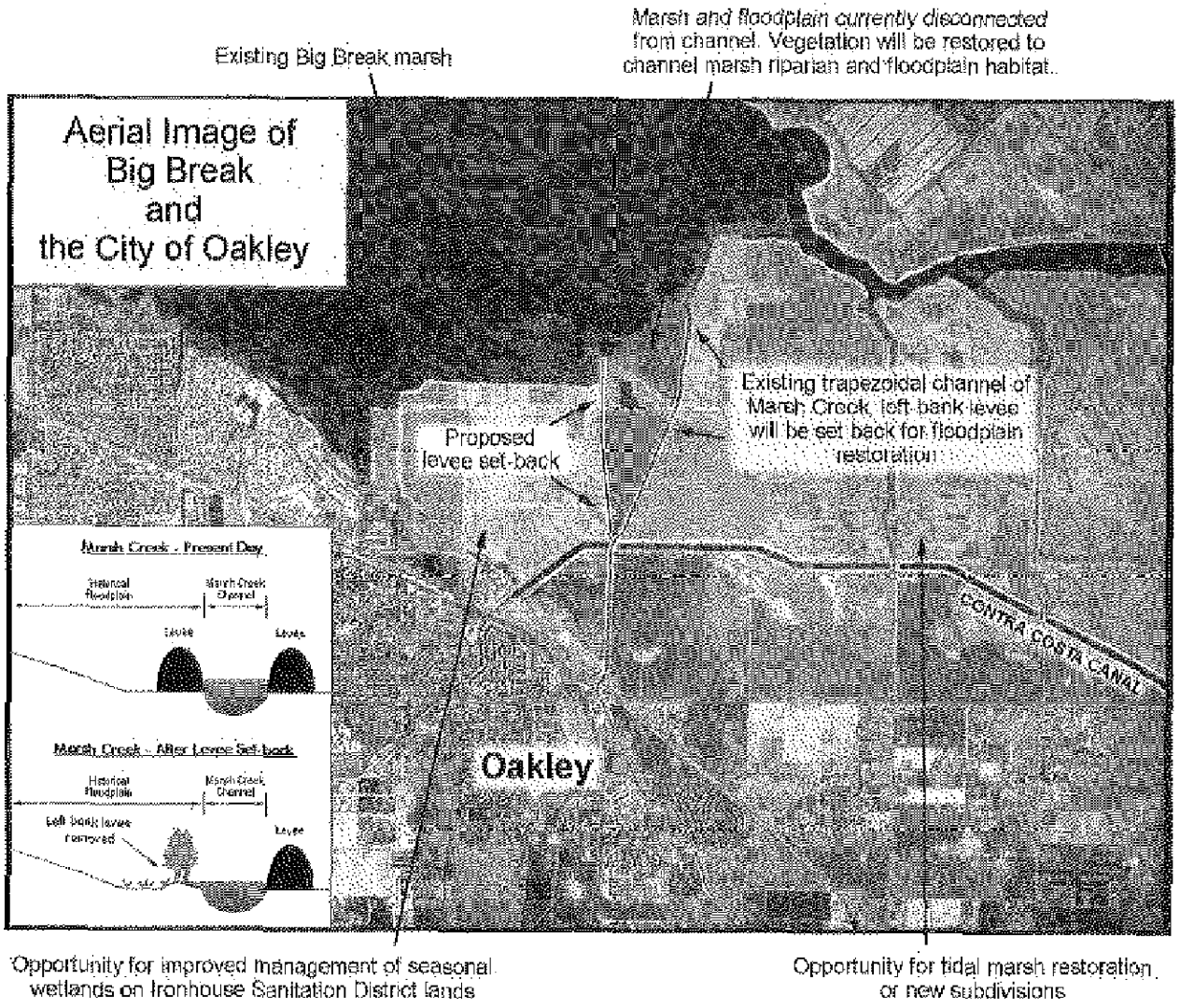

ECOLOGICAL/BIOLOGICAL BENEFITS

Ecological/Biological Objectives

- Protect and improve the quality of water and sediment flowing into the Big Break marsh.
- Improve conditions for native fish including Chinook salmon and Sacramento splittail, both identified as priority species in the PSP.
- Manage or eradicate harmful exotic species.
- Create riparian, aquatic, and wildlife corridor between Big Break and Mt. Diablo.
- Identify restoration opportunities.

The opportunity to protect and restore the Marsh Creek watershed may not exist in the years ahead due to the rapid pace of urbanization. It will be possible to implement many of the focused actions described in the proposal solicitation project ten years from now, because they are under no threat from urbanization. It will be possible to protect and restore the Yolo Bypass, Franks Tract, McCormmack Williamson, Statten Island, the Suisun Marsh, and many upper watersheds 10 years from now, but the opportunity to restore Marsh Creek will almost certainly be lost.

The independent scientific review panel that reviewed the ERP in 1997 recognized this fact when they concluded that "the most cost-effective way to protect systems is to prevent impacts. Preventing damage is much easier than repairing it. The ERPP should more explicitly embrace an anti-degradation philosophy (pg. 30)." We have a chance in Marsh Creek to save what is left before it is lost. It is not so engineered and structured that it could not be repaired with citizen stewardship and a modest investment. We hope to restore one of the last remaining watersheds in Contra Costa County that has a chance and is cost effective .

Urbanization of the Marsh Creek watershed will inflict an enormous ecological cost on the biological heart of the Delta. The western Delta is the primary habitat for numerous priority species and large concentrations of native fish, particularly splittail, have been observed in Big Break. Juvenile salmon have been documented in Marsh Creek (Slotton, 1998). Marsh Creek drains directly into Big Break and the Western Delta. Degradation of water quality in Marsh Creek could degrade water quality in Big Break and the Western Delta. Stemming the tide of toxics, metals, and exotics that are almost certain to follow urbanization of the watershed without prophylactic actions will be costly if not futile.

The lack of flooded vegetation in the Bay Delta system is a major factor limiting populations of Sacramento splittail. Restoration of floodplain habitat in the lower reaches of Marsh Creek could benefit splittail. During years when Marsh Creek floods but the mainstem rivers do not flood, Marsh Creek flood plain could serve as an important source of splittail recruitment. Pacheco Creek, a similar sized watershed in Contra Costa County provides spawning habitat for splittail. A linked proposal for levee setbacks and restoration of marsh and flood plain at the mouth of Marsh Creek (figure 2) would most likely provide suitable spawning habitat for the endangered Sacramento splittail (ERP PG. 207) and excellent rearing habitat for juvenile salmonids (ERP 211).

It may be possible to restore intermittent or annual runs of salmon or steelhead to Marsh Creek as numerous historical sources describe salmon runs in the creek. Unverified local anecdotes report

historical salmon spawning in Marsh Creek as far upstream as Brentwood during wet years. Dr. Darrel Slotton sampled juvenile salmon in Marsh Creek in 1995. Other reports describe migrating salmon blocked below drop structures. Habitat in Marsh Creek or its tributaries may be suitable for spawning as well. Well-shaded portions of Marsh Creek just above Brentwood support perennial flows in most years. Although the main stem of the creek is dammed at the Marsh Creek Reservoir site, the headwaters of Sand Creek in Black Diamond Regional Park are intermittently accessible and flowing for several months each year.

Although western pond turtles and red legged frogs are nearly extirpated from the San Joaquin Valley, they still persist in the Marsh Creek Watershed (Jennings and Holland, pers. Com. 1997). Red legged frogs are currently confined to the headwaters but western pond turtles have recently been observed in Marsh Creek flood control channel at Big Break. Restoration of these species is an objective of the ERP (pg. 331 and 334). Other native aquatic species including hitch and roach are relatively abundant (pg. 345). Preserving and restoring Marsh Creek will provide a potential migration corridor between the headwaters and the Delta for these species.

Introduction of exotic species into Marsh Creek could harm native species in both Marsh Creek and the Western Delta. This project will identify sources of exotic species and help educate watershed residents about the exotic species problem In preparing this proposal we visited one educational institution that maintains several exotic herptofauna species from all over the world for educational purposes. They proudly informed us that they had recently "restored" bullfrogs to Marsh Creek. Predation by bullfrogs and other factors have nearly extirpated red legged frogs and western pond turtles from the entire San Joaquin Valley. Hopefully, this project will make some progress in the battle to educate citizens about the threats from invasive exotic species. Ideally, this will result in a local initiative to manage and reduce exotic plant and animal species in the Marsh Creek watershed.

Preserving or restoring Marsh Creek will provide an important corridor for many aviafauna and terrestrial species. The applicants recently observed a red fox along the lower end of Marsh Creek. Other mammals including Tule Elk have been observed nearby. A small refuge for legless lizards exists near the mouth of the Creek. Riparian forest restored based on information derived from this project may support nesting and migratory habitat for neo-tropical birds.

Linkages
To our knowledge, no projects along the Big Break shore line or in the Marsh Creek watershed have been funded by CALFED agencies.

This project will be integrated into a restoration strategy for the Big Break shoreline that is described in a separate proposal titled: "The Delta Science Center at Big Break: A Unique Opportunity for Restoration, Research & Education." That proposal includes levee set back on lower Marsh Creek to restore approximately 50 acres of riparian, marsh, and flood plain habitat. These proposals, combined with the recent acquisition of the eastern half of Big Break would protect nearly the entire shore of Big Break. The Delta Science Center has contacted the last remaining private landowner along Big Break regarding acquisition of the parcel between Emerson Slough and Marsh Creek. The landowner expressed a willingness to sell at the market

price. Acquisition, protection, and restoration of all these parcels would result in over 3,000 acres of tidal marsh and riparian habitat restoration.

The condition of the Marsh Creek watershed bears directly on the health of the Delta. Numerous endangered fish spend a portion of their life cycle in the Western Delta and some are known to concentrate in Big Break itself. Urbanization of the Big Break watershed will surely degrade these habitats if protective action is not taken soon.

The ERP identifies the strategic objective to "halt as much as is possible the conversion of agricultural land to urban and suburban uses in areas adjacent to restored aquatic, riparian, and wetland habitats and manage these lands in ways that are favorable to birds and other wildlife" (Goal 4, objective 4 of the ERP pg. 103). The ERP also identifies control and reduction of exotic species as a primary goal (Goal 5: pg. 27 of strategic plan) and this effort will hopefully stem the tide of exotics from Marsh Creek.

Protection and restoration of the lower creek will restore flood plains and riparian forest, objectives of the ERP (pp. 47 and 83). Restoration of water quality in the creek will protect important tidal perennial aquatic habitat (pg. 111) in Big Break and maintain future opportunities for marsh restoration in and around Big Break.

System-Wide Ecosystem Benefits

Protection and management of the Marsh Creek sediment supply will facilitate opportunities for restoration of tidal marsh in and along Big Break that are described in a separate proposal titled: "The Delta Science Center at Big Break: A Unique Opportunity for Restoration, Research & Education." Enhancement of Marsh Creek water quality will protect aquatic species throughout the Marsh Creek watershed and the Western Delta—critical habitat for numerous native species. Restoration of the riparian corridor will restore connectivity between habitats in the Delta and upper watershed.

Compatibility with Non-Ecosystem Objectives

The project will protect and improve Delta water quality by reducing polluted run-off into the Delta. There are no conflicts with other CALFED objectives. No third party impacts are anticipated, but the DSC will work closely with a variety of local stakeholders, including local landowners to proactively avoid any impacts or conflicts.

TECHNICAL FEASIBILITY AND TIMING

No permits or environmental review will be required for tasks in this phase of the proposal, but project participants will work closely with the Delta Protection Commission, Contra Costa County, the Regional Water Quality Control Board, the Cities of Brentwood and Oakley, the State Lands Commission and other agencies with jurisdiction to anticipate all environmental compliance and permitting requirements during subsequent phases of the project.

This project is organized and supported by local interests. It will be managed by the Delta Science Center, a non-profit 501C-3 organization. Numerous local groups, interests, and institutions are represented on the Board of the Delta Science Center including local agriculture, local developers, CCWD, EBRPD, Audubon, Sierra Club, etc.

The Delta Science Center currently works with many local schools and intends to actively integrate local teachers and students into the project. A few local teachers will receive special training on data collection and evaluation from experts at SFEI and NHI.

Other local interests, including Brentwood City Officials, enthusiastically support the project. If funded, the project applicants will actively seek out other members of the community for participation and input on the project.

MONITORING AND DATA COLLECTION METHODOLOGY

Biological/Ecological Objectives
This project is focused on collecting and evaluating data necessary to make informed decisions about the future management and restoration of Marsh Creek. Josh Collins, a member of the CMARP panel, will review the data collection protocol. Data collected will entered into SFEI's Eco Atlas and be posted on the web for use by agency scientists, school groups, and other interested parties. Monitoring study design and reports will be peer reviewed.

Monitoring Parameters and Data Collection Approach
Baseline monitoring and analysis will focus on describing hydrology, channel morphology, fluvial sediment transport functions, extent of riparian vegetation, historical changes in geomorphology and riparian vegetation. Dr. Darell Slotton of the UC Davis Mercury group will be retained to collect bioassay fish and macro invertebrate samples from stations he established and monitored between 1995-97 to characterize trends in species presence and mercury concentrations.

The hydrologic and geomorpic analysis will include describing, measuring, and mapping the following: flow duration and flood frequency; perennial pools and perennial stream reaches; springs, confluences, points of diversion, and point sources of flow input, such as storm drain out-flows; major sediment sources associated with terraces, banks, or the channel bed; major sediment source reaches, transport reaches, and storage reaches; sediment size using Wolman pebble count; the relationships between bankfull geometry and channel order and drainage area; conditions of bank and terrace engineering relative to existing bankfull height; typical rates of channel bed aggradation or degradation; and the extent and distribution of riparian vegetation.

We will establish monumented cross-sections and describe longitudinal profiles of thalweg, bar tops, and terrace heights relative to existing bankfull stage for selected reference reaches. All permanent cross-sections will extend from hillslope to hillslope to encompass existing and historic floodplain features, including but not limited to: remnant channels, existing or abandoned roads and railroad grades, irrigation ditches, changes in vegetation type and other hydro-geomorphically relevant features.

Field equipment will include self-leveling optical level, 300' cloth measuring tape, 100' cloth measuring tape, Brunton compass, tree core holders and cement, tree diameter measuring tape, 25' fiberglass telescoping survey rods, 1:2000 scale photo base map sheets, mm ruler for pebble counts and D50 analysis, 35 mm camera and print film, waterproof field notebook, and waterproof data sheets and clipboards. The base map will be constructed from scale 1:2,000 black and white aerial photographs taken in 1956. The photos will be scanned at 300-600 DPI, geo-rectified, and mosaic-ed based upon a 30m-node Digital Elevation Model provided by the US Geological Survey.

Data Evaluation Approach
Channel parameters will only be measured once during this phase. Project scientists will quality control and analyze data collected by volunteers. The results of the analysis will be published in a peer reviewed journal and used to develop an understanding of historical hydrological, geomorphic, and riparian changes and implications for restoration planning.

I) Biological/Ecological Objectives			
Hypothesis/Question to be Evaluated	Monitoring Parameters(s) and Data Collection Approach	Data Evaluation Approach	Comments/Data Priority
Has the creek channel incised over time?	Survey thalweg elevation and bank elevation.	Compare present and historic survey data.	
Has channel width increased?	Survey width, analyze aerial photographs.	Compare present and historic data and photos.	
Has riparian vegetation been reduced over time and why?	Map vegetation from historic and present aerial photos.	Overlay historic and present vegetation maps	
Has the frequency of flooding in Marsh Creek been reduced?	Annual maxima data from USGS gauge and or reference sites.	Compare present to past or reference sites.	
Did salmonids ever spawn in Marsh Creek?	Review historic newspaper and grey literature, evaluate historic hydrology, barriers and habitat conditions.		
Has the size of peak flow events on Marsh Creek increased?	Annual maxima data from USGS gauge and or reference sites.	Compare present to past or reference sites.	
How much sediment is transported through Marsh Creek and its tributaries?	Measure channel cross section and bed size distribution.	Apply sheer stress equations and regional regression analysis.	
How much sediment has been eroded from the bed of banks?	Measure bank retreat in field.	Calculate the volume of bank material.	

This project will most likely not require any environmental review under CEQA, NEPA, or other environmental laws.

LOCAL INVOLVEMENT

This project is organized and supported by local interests. It will be managed by the Delta Science Center, a non-profit 501C-3 organization. Numerous local groups, interests, and institutions are represented on the Board of the Delta Science Center including local agriculture, local developers, CCWD, EBRPD, Audubon, Sierra Club, etc.

The Delta Science Center currently works with many local schools and intends to actively integrate local teachers and students into the project. A few local teachers will receive special training on data collection and evaluation from experts at SFEI and NHI.

Other local interests, including Brentwood City Officials, enthusiastically support the project. If funded, the project applicants will actively seek out other members of the community for participation and input on the project.

The proposed program will build on, and attempt to focus, numerous initiatives to study and restore the creek that have been developed by local organizations. The Delta Science Center and the EBRPD regularly host creek study programs for local schools. Additionally, EBRPD manages parks and programs in both the headwaters and at the mouth of Marsh Creek and maintains a trail between Big Break and the City of Brentwood. The City of Brentwood's master plan developed innovative guidelines for re-naturalizing the Marsh Creek channel as sub-divisions are constructed on adjacent lands. The Dainty Education Center in Brentwood has developed an educational curriculum that emphasizes the ecological and social values of Marsh Creek. The City of Brentwood's Marsh Creek Advisory Committee regularly organizes creek clean-up days and sponsors an adopt-a-creek program with participation from the scouts, the 4-H program, the Rotary Club and other local groups. The Contra Costa County Flood Control Agency has initiated an environmentally friendly flood control effort to simultaneously achieve flood control and ecosystem objectives in selected reaches of Marsh Creek. The Contra Costa Water District has collected high quality data on conditions in the headwaters of Marsh Creek.

Although local residents support these programs, they lack a central, organizing focus that integrates them at the watershed level. Teachers and professors from local schools and colleges lead their students in data collection exercises but lament the fact that there is no organized system for utilizing the data they collect. The Brentwood master plan for the Creek is a great example of enlightened planning but does not extend to the portions of the Creek outside of the City limit. According to its members, the once active Marsh Creek Advisory Committee has historically had difficulty integrating creek issues into local school curricula and has otherwise lost momentum in recent years. This project will bring all of these efforts and others together in a renewed effort around the Watershed Science Program.

COSTS

Budget Costs and Third Party Impacts

Table 3 on the following page depicts a detailed budget for the entire project and each project collaborator. The extensive budget detail reflects the level of effort and thought that went into this proposal and is indicative of the project management and implementation skills of project collaborators.

Table 4 depicts a sample quarterly budget.

Below summary of budget for three phases: This proposal seeks funds for phase 1 and 2 only.

• Phase I: Public Outreach and Basic Data Collection	$70,355
Task 1. Public Outreach and Education, Agency Coordination	16,840
Task 2. Compile and analyze existing information and data	48,715
Task 3. Field reconnaissance and preliminary survey	4,800
• Phase II: Citizen Training, Detailed Investigation, restoration design	$196,400
Task 4. Citizen Training and Monitoring	61,830
Task 5. Detailed Analysis	63,630
Task 6. Identify Obvious Resource Problems and Restoration Strategies	22,540
Task 7. Public presentation and reporting	48,400
• Phase III: Implementation and Monitoring	uncertain

No third party impacts are anticipated.

Cost-sharing

• Total before Cost Share	$266,755
• Total Requested after Cost Share	$163,474
Total Cost Share	**$103,303**

East Bay Regional Park Districts will contribute $34,120 in in-kind services associated with GIS and interpretive and educational programs focused on the Watershed Science Program.

The Delta Science Center will contribute in kind services or funding of 63,183. Much of this contribution will be in the form of skilled volunteers including Chris Hagelin, Delta Science center consultant and biology professor at Los Medanos Community College. She recently spent her sabbatical on a watershed assessment of Marsh Creek.

The Natural Heritage Institute will contribute another $6,000 of in kind services or funding.

TABLE 4: SAMPLE QUARTERLY BUDGET

Task	Quarterly Budget Oct-Dec 1999	Quarterly Budget Jan-Mar 2000	Quarterly Budget April-June 2000	Quarterly Budget July-Sep 2000	Quarterly Budget Oct-Dec 2000	Quarterly Budget Jan-Mar 2001	Quarterly Budget April-June 2001	Total
1. Public Outreach and Education, Agency Coordination	5,613	5,613	5,613					16,840
2. Compile and analyze existing information and data	16,238	16,238	16,238					48,715
3. Field reconnaissance and preliminary survey		4,600						4,600
4. Citizen Training and Monitoring		15,458	15,458	15,458	15,458			61,830
5. Detailed Analysis				15,908	15,908	15,908	15,908	63,630
6. Identify Obvious Resource Problems and Restoration Strategies						11,270	11,270	22,540
7. Public presentation and reporting	6,914	6,914	6,914	6,914	6,914	6,914	6,914	48,400
	28,766	49,023	44,223	38,279	38,279	34,092	34,092	266,755

Table IV-4. Cost Breakdown for Phase 1 and 2, Category 3 - Marsh Creek Watershed Science Program
Project Totals: Summary Sheet

Project Phase and Task	Direct Labor Hours	Direct Salary and Benefits	Service Contracts, Dollars	Material and Acquisition Contracts, Dollars	Miscellaneous and Other Direct Costs, Dollars	Overhead Labor (General Administration and Fee), $	Total Cost	
Phase I - Public Outreach and Basic Data Collection								
1. Public Outreach and Education, Agency Coordination								
A. brief local schools and citizens	120	4400				2960	7360	
B. Assemble core group of teachers and citizens.	152	5724				3756	9480	
C. meet with landowners and vested stakeholders.							0	
D. Agency coordination.							0	
2. Compile and analyze existing information and data							0	
A. Physical and Biological data preparation and analysis							0	
i. compile available environmental maps and data	80	3880				970	4850	
ii. Digitize sub-watersheds, and channel profile	20	960				240	1200	
iii. analyze meteorologic, hydrologic data, and major events	50	2400				600	3000	
iv. estimate extent of sewered areas and water service	15	720				180	900	
B. Cultural assessment							0	
i. evaluate demographics, identify community centers	34	1648				412	2060	
ii. map jurisdictional boundaries	20	960				240	1200	
iii. identify and map relevant government services	37	1784				446	2230	
C. Build geographic information system							0	
i. Develop rectified digital aerial base map	300	14850	2000			3750	20600	
ii.compile and create digital maps from other tasks	105	5340	6000			1335	12675	
3. Field reconnaissance and preliminary survey							0	
A. classify representative reaches, sketch cross sections	52	2496				624	3120	
B. pebble counts and bed material analysis	16	768				192	960	
D. map locations of engineered structures	6	288				72	360	
E. map extent of perennial flows, large pools, etc.	6	288				72	360	
Phase II - Citizen Training, detailed analysis, and address obvious problems.								
4. Citizen Training and Monitoring							0	
A. Coordinate public data collection efforts							0	
i. develop data collection and reporting protocol	30	1560				390	1950	
ii. coordinate "core group"	60	1860				1860	3720	
iii. assist "core group" in data collection.	600	24100				13000	37100	
iv. train core group in standard reporting	88	4124				1496	5620	
v. organize data collection	220	8520				4920	13440	
5. Detailed Analysis							0	
A. Map and aerial photo analysis							0	
I. map and describe extent of past floods	28	1352				338	1690	
ii. Map extent of vegetation change	135	6448				1612	8060	
iii. Map major land-use changes	27	1304				326	1630	
iv. Compile DEM	20	960				240	1200	
v. Drainage area estimates and analysis	16	784				196	980	
vi. Calculate storm drain area analysis	34	1648				412	2060	
vii. Map gullies sand landslides	29	1408				352	1760	
B. Field mapping and measurements	0	0					0	
I. Habitat and vegetation mapping	222	10824				2706	13530	
iii. survey cross sections, establish permanent bench marks	64	3072				768	3840	
iv.detailed geomorphic maps of representative reaches	64	3232				808	4040	
v. water quality analysis (including rapid bioassessments)	160	5640	15000			4200	24840	
6. Identify Obvious Resource Problems and Restoration Strategies							0	
A. Community based problem identification.	80	3710				1160	4870	
B. Restoration Alternatives Analysis.	120	5670				1650	7320	
C. Design Restoration Strategies	170	8280				2070	10350	
7. Public presentation and reporting							0	
A. prepare a public report	165	7260			800	2745	10805	
B. prepare a technical report	160	7760			1500	1940	11200	
C. develop web site for public access to data and maps	80	3500	5000			1340	9840	
D. present at public meetings and interpretive tours	190	7140				4575	11715	
E. solicit recommendations for future steps.	80	3500				1340	4840	
Total Costs - With no Cost Sharing	3655	170162	28000		2300	66293	266755	30300
Total Costs - With Cost Sharing							163474	

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Table IV-1, Cost Breakdown for Phase 1 and 2, Category 3 - Marsh Creek Watershed Science Program
NHI Summary Sheet 4

Project Phase and Task	Direct Labor Hours	Direct Salary and Benefits	Service Contracts, Dollars	Material and Acquisition Contracts, Dollars	Miscellaneous and Other Direct Costs, Dollars	Overhead Labor (General Administration and Fee), $	Total Cost
Phase I - Public Outreach and Basic Data Collection							0
1. Public Outreach and Education, Agency Coordination							0
A. brief local schools and citizens							0
B. Assemble core group of teachers and citizens.							0
C. meet with landowners and vested stakeholders.							0
D. Agency coordination.	80	3840				960	4880
2. Compile and analyze existing information and data							0
A. Physical and Biological data preparation and analysis		0					0
i. compile available environmental maps and data	30	1440				360	1830
ii. Digitize sub-watersheds, and channel profile	20	960				240	1220
iii. analyze meteorologic, hydrologic data, and major events	50	2400				600	3050
iv. estimate extent of sewered areas and water service	15	720				180	915
B. Cultural assessment		0					0
I. evaluate demographics, identify community centers	15	720				180	915
ii. map jurisdictional boundaries	20	960				240	1220
iii. identify and map relevant government services	25	1200				300	1525
C. Build geographic information system							0
I. Develop rectified digital aerial base map	200	9600	$1,000			2400	13200
ii.compile and create digital maps from other tasks	30	1440	$2,000			360	3830
3. Field reconnaissance and preliminary survey		0					0
A. classify representative reaches, sketch cross sections	6	288				72	366
B. pebble counts and bed material analysis	8	384				96	488
D. map locations of engineered structures		0					0
E. map extent of perennial flows, large pools, etc.		0					0
Phase II - Citizen Training, detailed analysis, and address obvious pr		0					0
4. Citizen Training and Monitoring							0
A. Coordinate public data collection efforts		0					0
i. develop data collection and reporting protocol		0					0
ii. coordinate "core group"		0					0
iii. assist "core group" in data collection.	100	4800				1200	6100
iv. train core group in standard reporting	8	384				96	488
v. organize data collection		0					0
6. Detailed Analysis							0
A. Map and aerial photo analysis		0					0
I. map and describe extent of past floods	16	768				192	976
ii. Map extent of vegetation change	15	720				180	915
iii. Map major land-use changes	5	240				60	305
iv. Compile DEM	20	960				240	1220
v. Drainage area estimates and analysis	12	576				144	732
vi. Calculate storm drain area analysis	30	1440				360	1830
vii. Map gullies sand landslides	25	1200				300	1525
B. Field mapping and measurements		0					0
I. Habitat and vegetation mapping		0					0
iii. survey cross sections, establish permanent bench marks	32	1536				384	1952
iv.detailed geomorphic maps of representative reaches		0					0
v. water quality analysis (including rapid bioassessments)		0					0
6. Identify Obvious Resource Problems and Restoration Strategies							0
A. Community based problem identification.	20	960				240	1220
B. Restoration Alternatives Analysis.	60	2880				720	3660
C. Design Restoration Strategies	100	4800				1200	6100
7. Public presentation and reporting		0					0
A. prepare a public report	80	3840			800	960	5680
B. prepare a technical report	120	5760			1500	1440	8820
C. develop web site for public access to data and maps	60	2880				720	3660
D. present at public meetings and interpretive tours	15	720				180	915
E. solicit recommendations for future steps.	20	960				240	1220
Total Costs - With no Cost Sharing	1237	59376				14844	75457
Total Costs - With Cost Sharing							75457

Table IV-1, Cost Breakdown for Phase 1 and 2, Category 3 - Marsh Creek Watershed Science Program
Delta Science Center Summary Sheet 1

Project Phase and Task	Direct Labor Hours	Direct Salary and Benefits	Service Contracts, Dollars	Material and Acquisition Contracts, Dollars	Miscellaneous and Other Direct Costs, Dollars	Overhead Labor (General Administration and Fee), $	Total Cost	
Phase I - Public Outreach and Basic Data Collection							0	
1. Public Outreach and Education, Agency Coordination							0	
A. brief local schools and citizens	40	1920				480	2400	
B. Assemble core group of teachers and citizens.	20	960				240	1200	
C. meet with landowners and vested stakeholders.	100	4800				1200	6000	
D. Agency coordination.	60	2880				720	3600	
2. Compile and analyze existing information and data							0	
A. Physical and Biological data preparation and analysis							0	
i. compile available environmental maps and data	40	1920				480	2400	
ii. Digitize sub-watersheds, and channel profile							0	
iii. analyze meteorologic, hydrologic data, and major events							0	
iv. estimate extent of sewered areas and water service							0	
B. Cultural assessment							0	
i. evaluate demographics, identify community centers	15	720				180	900	
ii. map jurisdictional boundaries							0	
iii. identify and map relevant government services	10	480				120	600	
C. Build geographic information system							0	
i. Develop rectified digital aerial base map							0	
ii.compile and create digital maps from other tasks							0	
3. Field reconnaissance and preliminary survey							0	
A. classify representative reaches, sketch cross sections	46	2208				552	2760	
B. pebble counts and bed material analysis	8	384				96	480	
D. map locations of engineered structures	6	288				72	360	
E. map extent of perennial flows, large pools, etc.	6	288				72	360	
Phase II - Citizen Training, detailed analysis, and address obvious problems.							0	
4. Citizen Training and Monitoring							0	
A. Coordinate public data collection efforts							0	
i. develop data collection and reporting protocol							0	
ii. coordinate "core group"							0	
iii. assist "core group" in data collection.	100	4800				1200	6000	
iv. train core group in standard reporting							0	
v. organize data collection	100	4800				1200	6000	
5. Detailed Analysis							0	
A. Map and aerial photo analysis							0	
i. map and describe extent of past floods	10	480				120	600	
ii. Map extent of vegetation change	115	5520				1380	6900	
iii. Map major land-use changes	20	960				240	1200	
iv. Compile DEM							0	
v. Drainage area estimates and analysis							0	
vii. Calculate storm drain area analysis							0	
viii. Map gullies sand landslides							0	
B. Field mapping and measurements							0	
I. Habitat and vegetation *mapping*	180	8640				2160	10800	
iii. survey cross sections, establish permanent bench marks	32	1536				384	1920	
iv.detailed geomorphic maps of representative reaches	24	1152				288	1440	
v. water quality analysis (including rapid bioassessments)	40	1920	15000			480	17400	
6. Identify Obvious Resource Problems and Restoration Strategies							0	
A. Community based problem identification.	40	1920				480	2400	
B. Restoration Alternatives Analysis.	30	1440				360	1800	
C. Design Restoration Strategies	40	1920				480	2400	
7. Public presentation and reporting		0					0	
A. prepare a public report	40	1920				480	2400	
B. prepare a technical report	20	960				240	1200	
C. develop web site for public access to data and maps		0	5000			0	5000	
D. present at public meetings and interpretive tours	40	1920				480	2400	
E. solicit recommendations for future steps.	40	1920				480	2400	
Total Costs - With no Cost Sharing	1222	58656	20000			14664	93320	20000
Total Costs - With Cost Sharing	592	28416	20000			7104	55520	

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Table IV-1, Cost Breakdown for Phase 1 and 2, Category 3 - Marsh Creek Watershed Science Program
EBRPD: Summary Sheet 3

Project Phase and Task	Direct Labor Hours	Direct Salary and Benefits	Service Contracts, Dollars	Material and Acquisition Contracts, Dollars	Miscellaneous and Other Direct Costs, Dollars	Overhead Labor (General Administration and Fee), $	Total Cost	
Phase I- Public Outreach and Basic Data Collection							0	
1. Public Outreach and Education, Agency Coordination							0	
A. brief local schools and citizens	80	2480				2480	4960	
B. Assemble core group of teachers and citizens.	100	3100				3100	6200	
C. meet with landowners and vested stakeholders.							0	
D. Agency coordination.							0	
2. Compile and analyze existing information and data							0	
A. Physical and Biological data preparation and analysis							0	
i. compile available environmental maps and data							0	
ii. Digitize sub-watersheds, and channel profile							0	
iii. analyze meteorologic, hydrologic data, and major events							0	
iv. estimate extent of sewered areas and water service							0	
B. Cultural assessment							0	
i. evaluate demographics, identify community centers							0	
ii. map jurisdictional boundaries							0	
iii. identify and map relevant government services							0	
C. Build geographic information system							0	
i. Develop rectified digital aerial base map		50	1,000			50	1100	
ii.compile and create digital maps from other tasks			4,000				4000	
3. Field reconnaissance and preliminary survey							0	
A. classify representative reaches, sketch cross sections							0	
B. pebble counts and bed material analysis							0	
D. map locations of engineered structures							0	
E. map extent of perennial flows, large pools, etc.							0	
Phase II - Citizen Training, detailed analysis, and address obvious problems.							0	
4. Citizen Training and Monitoring							0	
A. Coordinate public data collection efforts							0	
i. develop data collection and reporting protocol							0	
ii. coordinate "core group"	60	1860				1860	3720	
iii. assist "core group" in data collection.	300	9300				9300	18600	
iv. train core group in standard reporting	20	620				620	1240	
v. organize data collection	120	3720				3720	7440	
5. Detailed Analysis							0	
A. Map and aerial photo analysis							0	
i. map and describe extent of past floods							0	
ii. Map extent of vegetation change							0	
iii. Map major land-use changes							0	
iv. Compile DEM							0	
v. Drainage area estimates and analysis							0	
vii. Calculate storm drain area analysis							0	
viii. Map gullies sand landslides							0	
B. Field mapping and measurements							0	
i. Habitat and vegetation mapping							0	
iii. survey cross sections, establish permanent bench marks							0	
iv.detailed geomorphic maps of representative reaches							0	
v. water quality analysis (including rapid bioassessmen	120	3720				3720	7440	
6. Identify Obvious Resource Problems and Restoration Strategies							0	
A. Community based problem identification.	10	310				310	620	
B. Restoration Alternatives Analysis.	10	310				310	620	
C. Design Restoration Strategies							0	
7. Public presentation and reporting							0	
A. prepare a public report	40	1240				1240	2480	
B. prepare a technical report							0	
C. develop web site for public access to data and map	20	620				620	1240	
D. present at public meetings and interpretive tours	120	3720				3720	7440	
E. solicit recommendations for future steps.	20	620				620	1240	$0
Total Costs - With no Cost Sharing	1020	31620	5000			31620	68240	$5,000
Total Costs - With Cost Sharing	510	15810	2500			15810	34120	($55,320)

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Table IV-1, Cost Breakdown for Phase 1 and 2, Category 3 - Marsh Creek Watershed Science Program
SF Estuary Institute: Summary Sheet 2

Project Phase and Task	Direct Labor Hours	Direct Salary and Benefits	Service Contracts, Dollars	Material and Acquisition Contracts, Dollars	Miscellaneous and Other Direct Costs, Dollars	Overhead Labor (General Administration and Fee), $	Total Cost	
							0	
Phase I- Public Outreach and Basic Data Collection							0	
1. Public Outreach and Education, Agency Coordination							0	
A. brief local schools and citizens		0					0	
B. Assemble core group of teachers and citizens.	32	1664				416	2080	13
C. meet with landowners and vested stakeholders.							0	52
D. Agency coordination.							0	
2. Compile and analyze existing information and data							0	
A. Physical and Biological data preparation and analysis							0	
i. compile available environmental maps and data	10	520				130	650	
ii. Digitize sub-watersheds, and channel profile							0	
iii. analyze meteorologic, hydrologic data, and major events							0	
iv. estimate extent of sewered areas and water service							0	
B. Cultural assessment							0	
i. evaluate demographics, identify community centers	4	208				52	260	
ii. map jurisdictional boundaries							0	
iii. identify and map relevant government services	2	104				26	130	
C. Build geographic information system							0	
I. Develop rectified digital aerial base map	100	5200				1300	6500	
ii.compile and create digital maps from other tasks	75	3900				975	4875	
3. Field reconnaissance and preliminary survey							0	
A. classify representative reaches, sketch cross sections							0	
B. pebble counts and bed material analysis							0	
D. map locations of engineered structures							0	
E. map extent of perennial flows, large pools, etc.							0	
Phase II - Citizen Training, detailed analysis, and address obvious problems.							0	
4. Citizen Training and Monitoring							0	
A. Coordinate public data collection efforts							0	
i. develop data collection and reporting protocol	30	1560				390	1950	
ii. coordinate "core group"							0	
iii. assist "core group" in data collection.	100	5200				1300	6500	
iv. train core group in standard reporting	60	3120				780	3900	
v. organize data collection							0	
5. Detailed Analysis							0	
A. Map and aerial photo analysis							0	
i. map and describe extent of past floods	2	104				26	130	
ii. Map extent of vegetation change	4	208				52	260	
iii. Map major land-use changes	2	104				26	130	
iv. Compile DEM							0	
v. Drainage area estimates and analysis	4	208				52	260	
vii. Calculate storm drain area analysis	4	208				52	260	
viii. Map gullies sand landslides	4	208				52	260	
B. Field mapping and measurements							0	
i. Habitat and vegetation mapping	42	2184				546	2730	
iii. survey cross sections, establish permanent bench marks							0	
iv.detailed geomorphic maps of representative reaches	40	2080				520	2600	
v. water quality analysis (including rapid bioassessments)							0	
6. Identify Obvious Resource Problems and Restoration Strategies							0	
A. Community based problem identification.	10	520				130	650	
B. Restoration Alternatives Analysis.	20	1040				260	1300	
C. Design Restoration Strategies	30	1560				390	1950	
7. Public presentation and reporting							0	
A. prepare a public report	5	260				65	325	
B. prepare a technical report	20	1040				260	1300	
C. develop web site for public access to data and maps							0	
D. present at public meetings and interpretive tours	15	780				195	975	
E. solicit recommendations for future steps.							0	
Total Costs - With no Cost Sharing	615	31980				7995	39975	0
Total Costs - With Cost Sharing	615	31980				7995	39975	

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APPLICANT QUALIFICATIONS

The Delta Science Center will be the lead contractor and fiscal agent. The EBRPD will conduct educational and interpretive programs. The San Francisco Estuary Institute and NHI will train DSC, EBRPD staff, and local teachers in data collection and analysis. NHI will serve as a special consultant to the Delta Science Center in the management of the project. NHI staff will supervise collection and analysis of much of the hydrologic and geomorphic data.

Although relatively new, The Delta Science Center is well established in East Contra Costa County. Multiple regional organizations and agencies are represented on the Board, and DSC has developed a strong program working with local schools. Stephen Barbata serves as the Executive Director. Mr. Barbata would serve as fiscal agent and project director for this project. He brings twenty-five years of experience in the design, building and funding of educational institutions. In his roles as project manager/director and executive director, he successfully developed the Coyote Point Museum for Environmental Education in San Mateo; Communities and Ecosystems, the permanent natural sciences galleries of the Oakland Museum; Wild California, a major renovation of the North American Hall at the California Academy of Sciences; and most recently the Lindsay Museum in Walnut Creek where he was also responsible for the successful completion of its $8 million capital campaign.

Chris Hagelin is a biology professor at Los Medanos Community College. During her sabbatical last semester her research focused on biological conditions in Marsh Creek.

Michael Moran is currently a Naturalist with the East Bay Regional Park District, implementing a comprehensive program of natural and cultural interpretation and education of the California Delta and East Contra Costa County. He has 16 years of experience in the environmental education field, including extensive work as a field and classroom interpreter and teacher trainer. He has worked with the National Park Service, California State Parks, United Nations' Man and the Biosphere Program, Oceanic Society's Project O.C.E.A.N., Yosemite National Institutes and several private and public schools. He has led whale watch and natural history expeditions in California, Alaska, Washington, New England, British Columbia, and Hudson Bay for 12 years. He has an MS from UC Berkeley is in Wildland Resource Science and focused on salmon restoration efforts in the San Joaquin River basin. He also holds a BA in Geography and Human Environmental Studies and a BA in Recreation and Leisure Studies from San Francisco State University.

Gregory Thomas, J.D., is a specialist in natural resources law and management institutions and the CEO of NHI, a non-profit environmental law and technical consulting firm. He has extensive experience in managing multi-disciplinary teams. The Natural Heritage Institute will serve as a special consultant to DSC and provide project management and planning services. John Cain will manage the day-to-day aspects of the project. He performed similar hydrologic and geomorphic analysis on Cache Creek and the San Joaquin River below Friant Dam and is currently a principal investigator on an EPA project on the Carmen Creek watershed in the North Fork of the Feather River. He has a graduate degree in environmental planning in UC Berkeley and has over eight years of research and management experience in the of aquatic habitat restoration.

NHI and San Francisco Estuary Institute Board member, Luna Leopold, Ph.D., is a world-renowned expert in hydrology and fluvial systems. He will advise on the project.

Dr. Joshua Collins of the San Francisco Estuary Institute received his Ph.D. in Entomological Sciences at the University of California at Berkeley and has done post-doctoral studies in Geography and Ecology at the University of California at Berkeley and Davis. Dr. Collins is a landscape ecologist and regional ecological planner with special expertise in the evolution and natural maintenance of streams and wetlands. He has been a professional ecologist in the Public Utilities Industry and a consulting ecologist in private practice for design and review of stream and wetland restoration projects. Since Dr. Collins joined the staff of SFEI in 1993, he has been the principal author and lead scientist for the Bay Area Wetlands Monitoring Plan, the Bay Area Watersheds Science Plan, the Bay Area EcoAtlas, and the Bay Area Regional Wetlands Ecosystem Goals Project. Dr. Collins oversees the SFEI Wetlands Science Program and the GIS laboratory, and co-manages the Watersheds Science Program.

Laurel Collins of the SFEI has over 15 years experience in research on riverine and wetland systems. Her work has focused on mapping and quantifying geomorphic change in central Californian Coastal watersheds. She has annually collected and map detailed geomorphic data from Wildcat Creek in Contra Costa County for over a decade. She is currently conducting watershed field work and analysis in the burn area of Point Reyes. She is particularly skilled at training people in field data collection techniques.

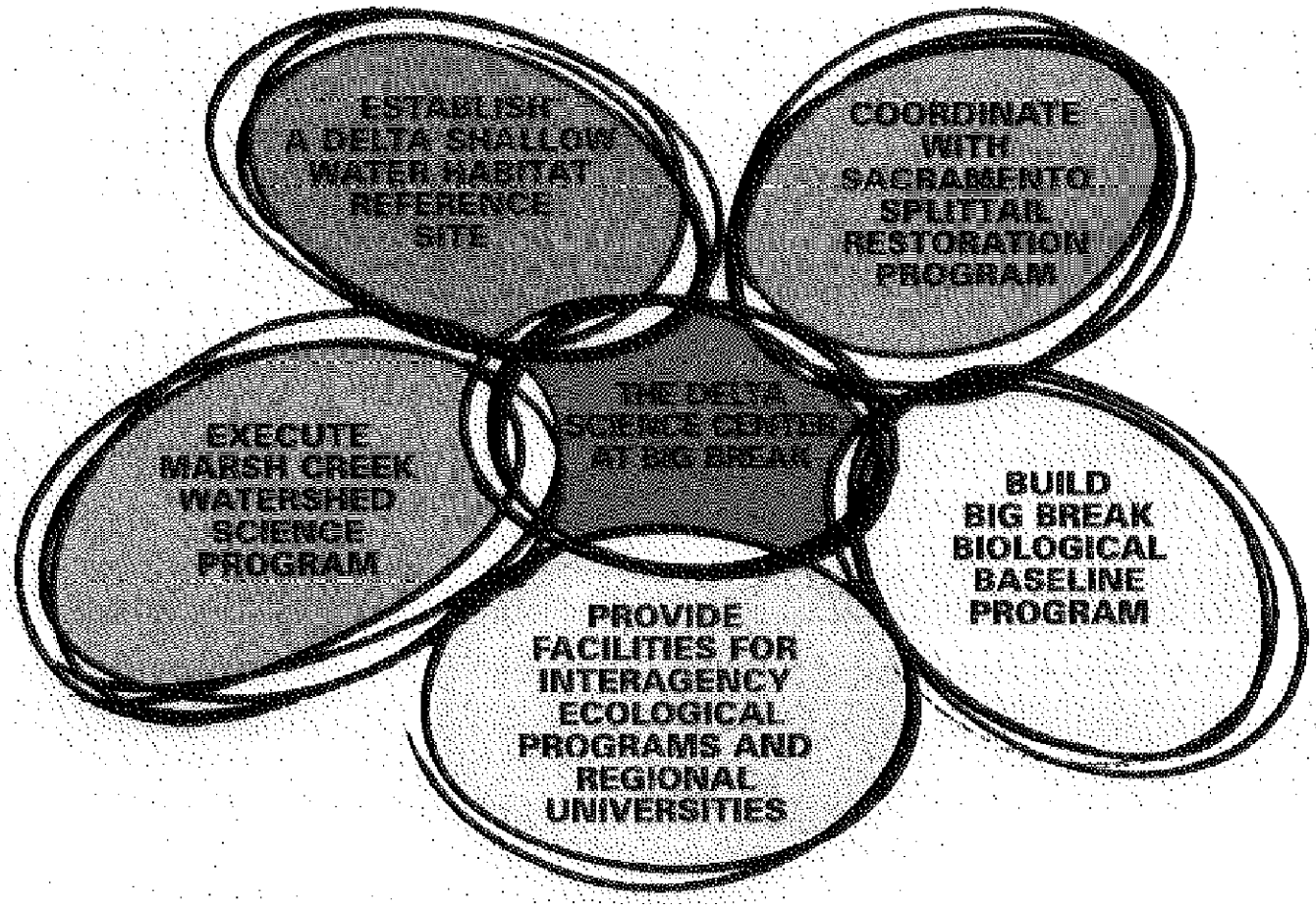

FIG 1: RESEARCH POSSIBILITIES FOR BIG BREAK MASTER PLANNING

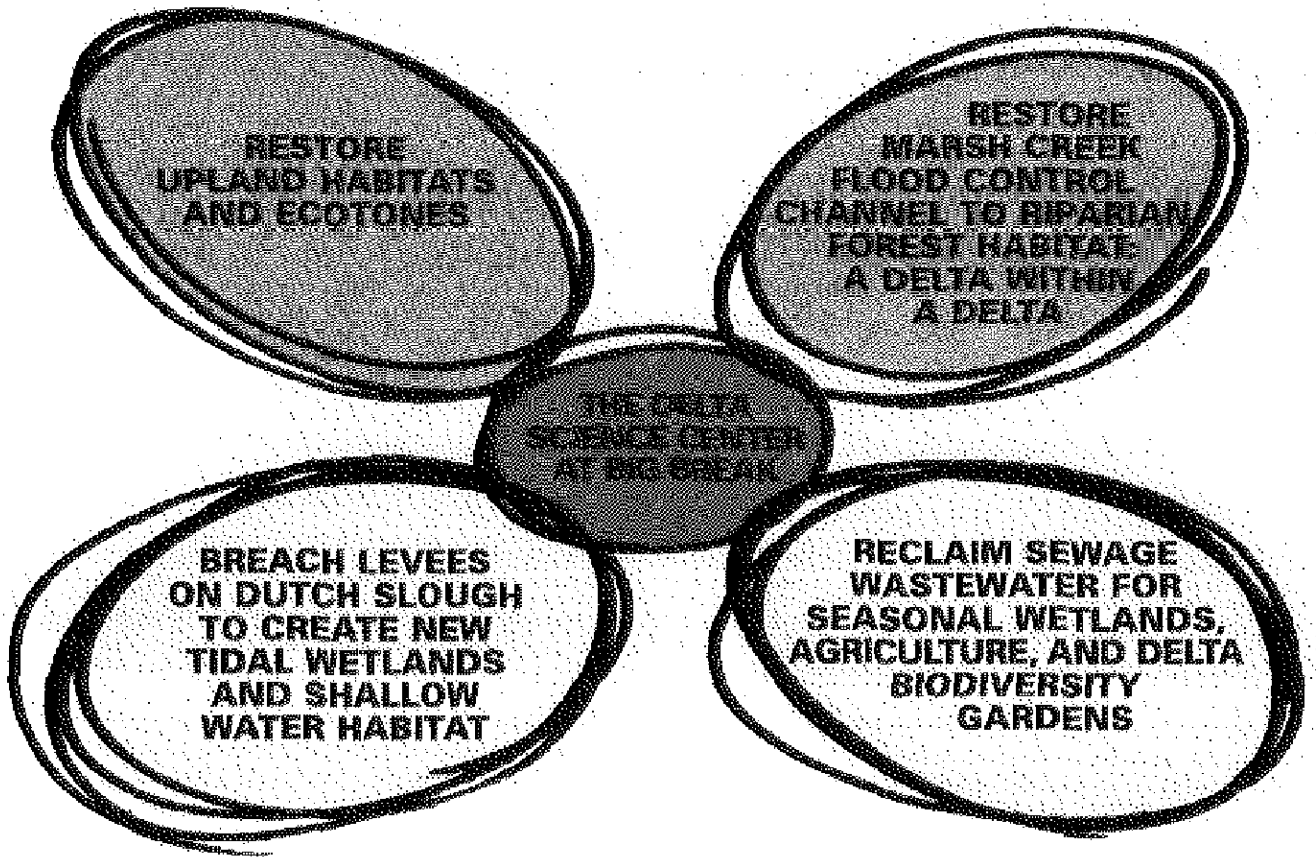

FIG 3a: RESTORATION POSSIBILITIES FOR BIG BREAK MASTER PLANNING

April 15, 1999

Joseph Canciamilla
Supervisor District 5
300 E. Leland Rd., Suite 100
Pittsburg, CA 94565

Dear Joe:

As a former Chairman and continued supporter of The Delta Science Center, we want you to know that we are pursuing two CALFED projects with which you are very familiar. One is the "Marsh Creek Watershed Science Program" and the other is "The Delta Science Center at Big Break: A Unique Opportunity for Restoration, Research and Education."

We look forward to your continued support on these projects and will keep you advised of their progress.

Sincerely,

Stephen Barbata
Executive Director

cc: Contra Costa County Planning Commission

THE DELTA
SCIENCE CENTER
At Big Break

I —017650

I-017650

April 15, 1999

Margit Aramburu, E.D.
Delta Protection Commission
P.O. Box 530
Walnut Grove, CA 95690

Dear Margit,

John Cain of the National Heritage Institute and I are pleased to bring to your attention that we are pursuing two CALFED projects with which you are very familiar. One is the "Marsh Creek Watershed Science Program" and the other is "The Delta Science Center at Big Break: A Unique Opportunity for Restoration, Research and Education."

We look forward to working with you on these projects.

Sincerely,

Stephen Barbata
Executive Director

THE DELTA
SCIENCE CENTER
At Big Break

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I-017651

LETTERS OF SUPPORT

"Train up a child in the way he should go; and when he is old, he will not depart from it."
PROVERBS 22:6

To: Steve Barbata
From: Shawn Guinn
Subj: Marsh Creek Watershed Science Program
Date: April 14, 1999

Dear Steve,

Thank you for sharing your Marsh Creek Watershed Program proposal with me at our recent meeting. As a long time politician, educator, and environmental activist for the Delta, I sincerely appreciate the efforts you are making to focus attention and resources on the Marsh Creek. By pulling all of the available resources together, I am confident that the detrimental effects of years of mismanagement can be reversed.

Our city has a council mandated creek and trail advisory committee that includes liaison members from a wide variety of community organizations including the regional primary and secondary school districts, Scouts, 4-H, Rotary, Soroptomist and the East Bay Regional Park district. We will put our resources behind your efforts with complete support. Together, I am confident we can make a significant difference.

Sincerely,

Shawn Guinn
Former Brentwood City Council Member
Owner/Director of Dainty Center/Willow Wood School
Chair: Brentwood Creek and Trail Advising Committee

1265 Dainty Avenue Brentwood, California 94513 • (925) 634-4539

ANTIOCH HIGH SCHOOL

700 West Eighteenth Street
Antioch, California 94509
(925) 706-5300
Fax (925) 706-1875

JEFF REICH
Principal
JIM HOLLINGSWORTH
Associate Principal

KATHLEEN CURRY
Vice Principal
ROGER HARTMAN
Vice Principal
GARY MCADAM
Vice Principal
FRANCES PARKER
Vice Principal

Stephen Barbata
Executive Director
Delta Science Center
96 Orchard Estates Drive
Walnut Creek, CA 94598
925-947-1473

April 1, 1999

Dear Mr. Barbata:

The Antioch High School Environmental Studies Academy would like very much to participate as a partner in the development of a Watershed Stewardship Program. We have read your current CALFED grant proposal and believe that the program you have described will provide a unique opportunity for our students to participate in a high quality, hands-on, community based, science program. We believe that community based environmental science programs must be an integral part of our science curriculum as they provide opportunities for our students to do "real science" and because they support our efforts to develop a "school-to career" program.

We support your efforts to expand the Delta Science Center's educational programs. Our students were very fortunate to have been given the opportunity to explore and learn about the Delta last year aboard the research ship, Superfish. This Delta Science Center program was an extraordinary opportunity for our students. The research that our students did before and after their delta journey required them to understand some of the real issues and constraints associated with resource management decisions. We are very familiar with the high quality educational programs that you have provided in the past and hope that success with this CALFED proposal will provide another opportunity for us to work together. We also appreciate your participation on Antioch High School's Environmental Studies Academy Advisory Committee. Your ability to pull many talented individuals from various organizations and agencies together facilitates program development at Antioch High School.

It is a logical next step to develop a Marsh Creek Watershed Stewardship Program as Marsh Creek is probably the last major creek in east Contra Costa County that has not been irreversibly degraded by urbanization. It is also a major creek that contributes to the San Juaquin River Delta System. It is essential that students understand the concept of watersheds such as the Marsh Creek Drainage Basin before they can fully understand our Delta ecosystem. Your desire to utilize Marsh Creek is a wise

I-017654

choice. We have utilized a portion of West Antioch Creek as a site for our students over the past few years because of its close proximity to our high school campus. However, West Antioch Creek, like most, has been reduced to a muddy flood conveyance channel. Each year our creek floods, scouring it of all vegetation to be replaced with new alien weeds and grasses the following year. It is difficult for students to understand fresh water ecology under these conditions. It would be a major improvement for our students to be able to participate in monitoring and research projects at Marsh Creek and they would be providing our community a service by helping collect data on one of the last major creeks that still has a chance of being protected.

We hope you will be successful with your grant proposal as we would like to involve our students in the following way:

Field Trips

Students from our Environmental Science class will visit Marsh Creek several times during the year to collect data, both physical and biological. Students will be able to see changes, if any, due to seasons. The data will be imported into a data base that can be used for developing base lines as well as for future research projects. Students will be given opportunities to learn about the historical perspectives associated with Marsh Creek. The East Bay Regional Park District has people that are very qualified and capable of providing this service to our students. Students will research topics that may include how native Americans utilized and impacted the watershed, the history of cattle ranching and the impacts this agricultural practice has had on the Marsh Creek Watershed, and how growing urbanization has affected Marsh Creek as an ecosystem. Because our students are part of an Academy, they remain as a team during a portion of their school day. These trips to Marsh Creek will fit nicely into our integration of their English, History, and Science curriculum.

Internships

We are currently developing unpaid internships for our Senior students. We want to provide opportunities for these students to participate in projects that require a high degree of dedication and care. We believe that many projects can be developed at Marsh Creek for these dedicated students. We hope these students will be able to do long term monitoring and research projects and that the work they complete will benefit others by providing information necessary for future restoration projects. At the end of each semester these students will present their findings to a panel of community members like yourself, possibly to the Environmental Studies Academy Advisory Committee.

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We are requesting that you include the following items in your grant proposal. We believe that funding for these items is essential if we are to participate fully in your program.

Transportation

The Delta Science Center will have to provide funding for buses so that students can be transported from Antioch High School to Marsh Creek. We will need one bus for each of the three field trips. The cost for each trip is approximately $200.00

Substitutes

Two teachers, myself and Roger Macdonald (English/History) will have to travel with the students on each field trip. Funds will have to be made available to pay for our substitutes. Each substitute costs approximately $100.00.

Permanent Field Test Sites

We believe that permanent field test sites will make the task of taking samples and performing data collection more beneficial and accurate. Example sites could include testing water chemistry, collecting aquatic insects, taking debris samples, sand pits for observing animal tracks, and perhaps a weather station.

Field Equipment

We can provide some equipment, however, certain supplies and materials will have to be purchased. This equipment should be stored at a central location so that it can be used by all groups that will participate in the watershed activities.

Again, we hope that you are successful and we look forward to continuing our work together. Please let us know at Antioch High School if we can be of any assistance.

Sincerely,

Jim Hybarger,
Environmental Science Teacher
Environmental Studies Academy
Antioch High School

LOS MEDANOS
COLLEGE

2700 East Leland Road
Pittsburg, CA 94565-5197
(510) 439-2181
FAX (510) 427-1599

Contra Costa
Community College
District

April 13, 1999

Mr. Stephen Barbata
Executive Director
Delta Science Center

Dear Mr. Barbata:

I have had the opportunity to review the proposal to "Initiate a Watershed Science Program on Marsh Creek". The proposed project represents an excellent opportunity to extend and strengthen field study experiences in the life sciences for students and faculty from Los Medanos College and the entire Contra Costa Community College District. I am confident that district faculty will embrace the plan to further their collaboration with the various educational partners of the Delta Science Center at Big Break.

As you know, a member of the Los Medanos College biological sciences faculty was awarded a full-semester sabbatical leave during 1998-99 which focused primarily on acquiring scientific data on the Marsh Creek watershed to further curriculum development in environmental biology in collaboration with the Delta Science Center. Further, we have affirmed our commitment to searching out ways to partner with the DSC in order to develop an off-campus site for the study of wetlands and wildlife ecology. Securing funding for the Watershed Science Program would certainly move us much closer to realizing this goal.

I am pleased to confirm our enthusiastic support for the project.

Sincerely,

Daniel W. Henry
Dean of Planning, Research, & Professional Development

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I-017657

Pittsburg High School

250 School Street
Pittsburg, California 94565
(925) 473-4100
Fax (925) 473-4183

Steve Barbata
Delta Science Center
86 Orchard Estates Dr.
Walnut Creek, CA 94598

13 April, 1999

The Pittsburg High School science department is in strong support of the Watershed Science Program on Marsh Creek. As Chair of the science department I represent 14 science teachers who are desperately seeking ways to provide 'real life' experiential science to our students. As a recent Master's recipient in environmental education, a member of the Program committee for the Delta Science Center, and a current recipient of a Toyota Tapestry grant in science, I have reviewed extensive research on the academic and motivational value of experiential education and there is no question that this type of instruction is highly beneficial.

Unfortunately, the extreme financial and logistical difficulties with getting students into the field are overwhelming. The CALFED grant for the Watershed Science Program on Marsh Creek could provide the exact impetus needed to produce a powerful science experience for students at Pittsburg High School, as well as, initiate the important first steps in the proper stewardship of the Marsh Creek watershed.

Sincerely,

Dan Hanel
Science Dept. Chair
Pittsburg High School
250 School St.
Pittsburg, CA 94565

I —017658

I-017658

CITY OF
BRENTWOOD

April 15, 1999

Stephen Barbata, Director
Delta Science Center
86 Orchard Estates Drive
Walnut Creek, CA 94598

SUBJECT: Marsh Creek Watershed Study Program

Dear Stephen:

We have reviewed your draft proposal for CALFED funds to create a Watershed Science Program on Marsh Creek. As Marsh Creek is the primary creek flowing through the City of Brentwood and has great value as an historic, ecological and recreational resource, we support the proposal.

Marsh Creek is the backbone of our City's open space and trail system and it truly is where our residents come together. By increasing the educational programs involving the creeks, it means a better informed community which in turn translates into a heightened level of attention to the creeks, water quality and the protection of the Marsh Creek watershed.

The City of Brentwood enthusiastically supports this effort. Please let us know what we can do to see this proposal translated into reality.

Sincerely,

Jon Ellam
City Manager

City Hall - 708 Third Street, Brentwood, California 94513 • (925) 634-6900 • Fax: (925) 634-6930

I-017659

Signatory Agencies:

Alameda County

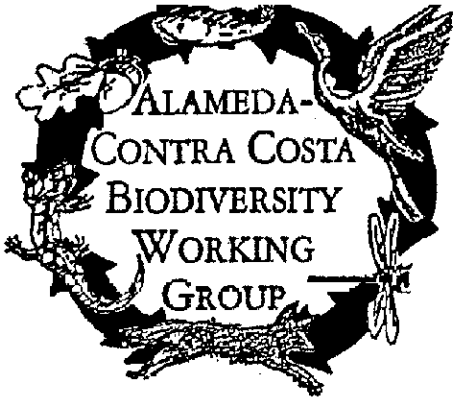
Contra Costa County

Contra Costa Water District

Department of Fish and Game

East Bay Regional Park District

East Bay Municipal Utility District



April 15, 1999

Mr. Stephen Barbata, Executive Director
Delta Science Center at Big Break
P.O. Box 1105
Oakley, CA 94561

Re: **Delta Science Center Proposal for CALFED Funds to Initiate a Watershed Science Program on Marsh Creek**

Dear Mr. Barbata:

The Steering Committee of the Alameda-Contra Costa Biodiversity Working Group("BWG") supports the proposal made by the Delta Science Center to obtain funding from the CALFED Bay-Delta Program to support initiation of a Watershed Science Program on Marsh Creek in eastern Contra Costa County. The Steering Committee consists of staff from the six agencies which sponsor the BWG, including the following five agencies which are directly involved with BWG activities in eastern Alameda and Contra Costa County: Alameda County, the California Department of Fish and Game, Contra Costa County, the Contra Costa Water District, and the East Bay Regional Park District. The Delta Science Center's proposal for Marsh Creek could complement the on-going work of the BWG in this area, improving the base of natural resource information and public involvement in this portion of Contra Costa County by contributing a hydrological perspective distinct from the biology-focused issues being addressed via the BWG.

The BWG Steering Committee has initiated a study of biological resources and land use in a 227,000 acre area of eastern Alameda and Contra Costa Counties, including the entire upper watershed of Marsh Creek. To ensure that this effort benefits from thorough public involvement, the Steering Committee has convened a Task Force with broad representation of agency (local, state, and federal), environmental, agricultural, developer, and community interests to complete this study by consensus. The study will include technical information, possibly including data on vegetation types, key habitat features, species sightings, and proposed land uses. Perhaps more important, the study will also include pragmatic, politically-viable consensus recommendations for improving the process of conserving biological resources. The Marsh Creek Watershed Science Program proposed by the Delta Science Center could benefit the BWG effort by providing another source of public involvement in natural resource issues as well as valuable technical information on water quality,

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aquatic biological resources, channel form, and other relevant subjects. Presumably, the BWG study and public process could present similar benefits to the Watershed Science effort. Recognizing these potential mutual benefits, as well as the potential for the Watershed Science Program to contribute to the identification and enhancement of the biological resources of the San Francisco Bay-Delta, the Steering Committee supports the Delta Science Center's Marsh Creek proposal to CALFED.

Should you have any questions on this letter or on the activities of the Alameda-Contra Costa County Biodiversity Working Group, please feel free to call me at (925) 335-1227.

Sincerely,

John Kopchik, Steering Committee Member
Planner, Contra Costa County Community Development Department

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STATE OF CALIFORNIA

NONDISCRIMINATION COMPLIANCE STATEMENT

STD. 19 (REV. 3-95) FMC

COMPANY NAME

THE DELTA SCIENCE CENTER at Big Break

The company named above (hereinafter referred to as "prospective contractor") hereby certifies, unless specifically exempted, compliance with Government Code Section 12990 (a-f) and California Code of Regulations, Title 2, Division 4, Chapter 5 in matters relating to reporting requirements and the development, implementation and maintenance of a Nondiscrimination Program. Prospective contractor agrees not to unlawfully discriminate, harass or allow harassment against any employee or applicant for employment because of sex, race, color, ancestry, religious creed, national origin, disability (including HIV and AIDS), medical condition (cancer), age, marital status, denial of family and medical care leave and denial of pregnancy disability leave.

CERTIFICATION

I, the official named below, hereby swear that I am duly authorized to legally bind the prospective contractor to the above described certification. I am fully aware that this certification, executed on the date and in the county below, is made under penalty of perjury under the laws of the State of California.

OFFICIAL'S NAME

Stephen Barbata

DATE EXECUTED	EXECUTED IN THE COUNTY OF
April 15, 1999	Contra Costa

PROSPECTIVE CONTRACTOR'S SIGNATURE

Stephen Barbata

PROSPECTIVE CONTRACTOR'S TITLE

Executive Director

PROSPECTIVE CONTRACTOR'S LEGAL BUSINESS NAME

THE DELTA SCIENCE CENTER at Big Break

I -017662

I-017662

Agreement No. _____

Exhibit _____

STANDARD CLAUSES --
SMALL BUSINESS PREFERENCE AND CONTRACTOR IDENTIFICATION NUMBER

NOTICE TO ALL BIDDERS:

Section 14835, et. seq. of the California Government Code requires that a five percent preference be given to bidders who qualify as a small business. The rules and regulations of this law, including the definition of a small business for the delivery of service, are contained in Title 2, California Code of Regulations, Section 1896, et. seq. A copy of the regulations is available upon request. Questions regarding the preference approval process should be directed to the Office of Small and Minority Business at (916) 322-5060. To claim the small business preference, you must submit a copy of your certification approval letter with your bid.

Are you claiming preference as a small business?

_____ Yes* _X_ No

*Attach a copy of your certification approval letter.